FOLDED HIGH-PROFILE RIDGE COVER, AND METHOD OF MAKING

Background of the Invention

Field of the Invention

The present invention relates to a low-cost, durable and highly aesthetic high-profile ridge cover made of sheet roofing material, and to a method of making the ridge cover. This high-profile ridge cover is appropriately used for roofing, and is effective to improve the aesthetics of a shingle roof.

Description of the Related Art

A conventional inorganic asphalt composition ridge cover is known in accord with United States patent no. RE 36,858, owned by the assignee of the present application. Manufacturing a ridge cover according to the RE 36,858 patent requires that an elongate strip or ribbon of sheet roofing material be partially cut through in the outline of the individual workpieces which will become ridge covers. Within the outline of each ridge cover workpiece, a T-shaped slit is formed by partially cutting through the work piece. Also, a plurality of transverse slits are formed along the length of the T-shaped slit in order to insure that the work piece will fold on itself at the locations of these transverse slits. The outlining, forming of the T-shaped slit, and forming of the plural transverse slits are all done while the individual workpieces are still part of the elongate strip of sheet roofing material. These cutting or slitting operations are performed by training the elongate strip about a roller having outwardly disposed knife edges protruding an appropriate distance above the roller surface, and in the shape of the slits to be formed. These knife edges are a high maintenance item in the manufacturing operation, and a reduction or elimination of the use of these knife edges for slitting operations would be an important improvement in the manufacturing of such folded ridge covers.

Summary of the Invention

In view of the above, the present invention provides an improved folded ridge cover made of sheet shingle material, and in which the folding operations for effecting transverse folds in the ridge cover are accomplished without the use of a slitting operation.

Further, the present invention provides a method of making such a ridge cover, and discloses also a method of making a manufacturing intermediate article from which such a folded ridge cover may be made by the application of further manufacturing steps.

Also, this invention provides a method and resulting manufacturing intermediate article in the form of an elongate strip or ribbon of sheet shingle material, for making a subsequent manufacturing intermediate article, in which the elongate strip of sheet shingle material has impressed into it a plurality of elongate longitudinal grooves, each one of which grooves traverse a plurality of work pieces of the strip, and which grooves are effective to cause folding of the workpieces at the location of the respective groove.

Surprisingly, the Applicant has discovered that a folded ridge cover according to the present invention is best processed while the sheet shingle material is at about room temperature. This eliminates the use or warming ovens, and also removes a scheduling requirement of the conventional folded ridge covers made of sheet shingle material. That is, while the folded ridge covers made of sheet shingle material according to the known technology are best processed warm, and thus require processing either soon after the sheet shingle material itself is made (i.e., while the sheet material is still warm), or require the use of a warming oven to reheat sheet shingle material that has cooled, such is not required in the processing of a folded ridge cover according to the present invention. Because the manufacturing process is most advantageously carried out with sheet shingle material that is at about room temperature, both urgencies of scheduling and the use of a reheating oven is eliminated.

Accordingly, the present invention according to one particularly preferred embodiment provides, a folded ridge cover comprising: an elongate sheet of flexible and durable composition sheet shingle material including a base web of inorganic fibers impregnated with a modified asphaultic matrix material, said modified asphaultic matrix material including asphalt and a flexibility improving additive; said elongate sheet being transversely back folded on itself at plural centrally disposed spaced apart transverse fold lines intermediate the length of said sheet to define a central transverse comparatively thickened portion for said ridge cover, said elongate sheet defining a T-shaped slit allowing said comparatively thickened portion to also fold double on itself in response to said elongate sheet being folded lengthwise, and said elongate sheet further defining plural spaced apart centrally disposed transverse grooves each extending across

said elongate sheet from side to side thereof for defining respective locations of said plural transverse fold lines.

Additional objects and advantages may be appreciated from a reading of the following detailed description of a single exemplary and preferred embodiment of the invention taken in conjunction with the following drawing Figures, in which:

Brief Description of the Drawing Figures

Figure 1 provides a fragmentary perspective view of plural ridge covers embodying the present invention installed on a roof;

Figure 2 is an enlarged fragmentary perspective view of the ridge covers seen in Figure 1, and as they might appear during installation;

Figure 3 provides a plan view of plural ridge covers embodying the present invention as they are generally folded and disposed adjacent one another during shipping;

Figure 4 provides a top plan view of an elongate sheet or strip of shingle material at an intermediate stage of manufacture, and from which several individual work pieces will be separated for further processing into ridge covers embodying the present invention;

Figure 5 is a bottom or underside plan view of the strip of shingle material seen in Figure 4;

Figure 6 is a top plan view of a single work piece, which upon further processing will become a ridge cover embodying the present invention;

Figure 7 is a bottom or underside plan view of the single work piece seen in Figure 6;

Figure 8 diagrammatically illustrates a step in the processing of the work piece of Figures 6 and 7;

Figure 9 is a top plan view of the work piece of Figures 6 and 7 after further processing in accord with the processing step depicted in Figure 8;

Figure 10 is a diagrammatic side elevation view of the workpiece of Figure 9, during a subsequent stage (i.e., first phase folding) of manufacturing;

Figure 11 provides a further diagrammatic side elevation view of the workpiece of Figure 10, and at a further subsequent stage of manufacturing;

Figure 12 illustrates the workpiece of Figure 11 in side elevation view and during a still

further step of manufacturing;

Figure 13 provides a side elevation view of the work piece of Figure 12 during the completion of a first phase of folding of the manufacturing process;

Figure 14 provides an end elevation view of the work piece of Figure 13 during a last phase folding of the workpiece, resulting upon completion of this folding in a folded ridge cover as is seen in Figure 3;

Figure 14a illustrates diagrammatically, a grouped or nested lengthwise folding of plural ridge covers in a group, which nested group of ridge covers is then packed into a shipping carton together; and

Figure 15 provides a top plan view of an alternative embodiment of an elongate sheet or strip of shingle material at an intermediate stage of manufacture, and from which several individual work pieces will be separated for further processing into ridge covers embodying the present invention.

Description of Preferred Exemplary Embodiments of the Invention

Viewing Figure 1, a roof 10 is seen to include a pair of generally planar and conventional shingle-covered inclined surfaces or fields 12, which intersect with one another at an inclined hip 14. At the hip 14, the roof 10 includes a plurality of aligned and partially overlapping ridge cover members 16. Those ordinarily skilled in the pertinent arts will appreciate that the same type of ridge cover member 16 employed at the hip 14 may be used also at the ridges and rakes (not shown) of the roof 10.

As is more particularly shown in Figure 2, as they are installed on the roof 10, the ridge cover members 16 each include a chevron-shaped sheet-like upper portion 18 and a similar chevron-shaped sheet-like lower portion 20, which upper and lower portions are connected by a centrally disposed thickened portion 22. The thickened portion 22 is thickened by repeated back folding of the sheet material (which sheet material is generally referenced with the numeral 24) from which the ridge cover 16 is formed. Because this sheet material 24 is generally in the range of from one-eight to three-sixteenth of an inch thick, and the thickened portion 22 is preferably formed by back folding the material 24 four times on itself, the portions 18 and 20 define

respective upper surfaces 26, and 28 which are spaced apart perpendicularly to the plane of the sheet material 24 by four times the thickness of the sheet material 24. That is, the upper surfaces 26, and 28 are spaced out of plane with each other by a dimension preferably in the range of from about one-half inch to about three-forth inch. Also, the upper portion 18 and lower portion 20 define respective longitudinal fold lines 30 and 32 which are similarly spaced apart from each other in a direction perpendicular to the fold lines.

On the roof 10 successive ridge cover members are installed upwardly along the hip 14 by nailing through the thickened portion 22 as is shown with the exposed nail heads 34 on one ridge cover, or alternatively, by nailing above the thickened portion 22 through the lower part of the portion 18, viewing particularly Figure 2. Each ridge cover 16 is installed with the lower portion 20 of the particular ridge cover overlapping the upper portion 18 of the preceding ridge cover to cover the nail heads exposed on this preceding ridge cover. In fact a lower or front end edge 36 of each successive ridge cover member 16 extends slightly down-slope or beyond the thickened portion 22 of the preceding ridge cover member. Consequently, the ridge covers 16 as installed on roof 10, provide a shadow, referenced on the drawing Figures with the numeral 38, falling on the lower portion 20 of the next lower ridge cover. Those ordinarily skilled in the pertinent arts will recognize that the existence and extent of the shadows 38 depends on the ambient lighting conditions, and that these shadows generally will be similar aesthetically to that of a wood shake roof at a hip, ridge, or rake of a roof.

Figure 3 illustrates a plurality of ridge covers embodying the present invention as they are folded and nested together for shipping to a job site (i.e., in a cardboard box, for example). It is to be noted that each ridge cover 16 is folded lengthwise on itself so that it is no longer chevron shaped. As so folded, the thickened central portion 22 is folded double on itself and is disposed between the lower extend of the upper portion 18 also folded lengthwise on itself. As is shown in Figure 3, the folded ridge covers 16 each have a relatively thick end portion (i.e., the upper end of the ridge cover) and a relatively thinner end portion, which is the lower portion of each ridge cover. The ridge covers 16 are preferably nested together for shipping by alternately reversing the direction of successive ridge covers, as is seen in Figure 3. As is further seen in Figure 3, in order to accommodate folding the central thickened portion 22 double on itself, the upper portion 18 and part of the thickened portion 22 (which is folded repeatedly on itself)

defines a T-shaped slit 40, which will be further illustrated and described below. As is seen in Figure 3, the T-shaped slit 40 allows the upper portion 18 and the central portion 22 to partially open up as it is folded about the thickened central portion 22 (that is, as the thickened central portion 22 is folded double on itself).

Turning now to Figures 4 and 5, a manufacturing intermediate article 42 for the ridge cover 16 is diagrammatically depicted. Figure 4 shows the top side (or side coated with granular material), while Figure 5 shows the bottom side of this manufacturing intermediate article. On the top side view of the article 42, the T-shaped slit 40 appears as a dashed line on each work piece 16'. However, on the bottom side view of Figure 5, the T-shapes slits 40 appear as solid lines, because these T-shaped slits are defined by shallow cuts impressed into the material 24 of the article 42. Moreover, the manufacturing intermediate article 42 is an elongate strip or ribbon of sheet-like shingle material, from which several individual ridge covers 16 will be formed after further manufacturing or processing. That is, as is seen by the outlines drawn on this diagrammatic depiction of the sheet like shingle material work piece 42, plural individual work pieces 16' are oppositely disposed in somewhat of a mirror image fashion generally on opposite sides of an elongate centerline 44 of this work piece.

Figures 6 and 7 respectively show top side and bottom side plan views of an individual one of the work pieces 16. As is to be noted viewing Figure 7, the work pieces 16' include a T-shaped slit 40. However, in contrast to the conventional technology, no plurality of spaced apart transverse score lines or slits are needed in order to insure that the work piece 16' will fold on itself at these locations. A different structure and different method of folding is effected by the present invention in order to repeatedly form the back folded thickened portion 22 of each successively manufactured ridge cover 16. The structure and method of back folding the thickened portion 22 according to the present invention achieves sufficient precision in the location of each back fold without the use of transverse folding slits. Further viewing the work piece 16' it is seen that it has a generally rectangular lower portion 46 (which is preferably square in the illustrated embodiment). This lower portion has an end edge 48 which is most preferable 8 inches in width. The end portion 46 has a pair of opposite side edges 46' which are each preferably 8 inches in length. The work piece has an overall length preferably of about 26 inches, and has a tapering upper end portion 50 with a width of about 6 1/8 inch at the end edge

50' The tapering upper end portion has a pair of opposite side edges 52, which define slight steps or notches (each indicated with the arrowed numeral 54) of about ¼ inch dimension in the width direction of the ridge cover work piece 16'.

Figure 8 provides a side elevation view of a work piece 16' during a step of the manufacturing process toward a completed ridge cover 16. As can be seen in Figure 8, a support member 56 engages against one face of the work piece 16' (i.e., in this case, against the back or bottom surface of the work piece) while an impressing member 58 engages against the opposite face of the work piece 16' (i.e., in this case, against the top or upper surface of the work piece). The member 58 defines or carries a protruding rib portion 58', which impresses into the work piece 16'. Most preferably, the members 56 and 58 (i.e., from the portion 58') are separated by a gap of about 0.030 inches at their closest (i.e., between the rib portion 58' and the support member 56), so that a transverse groove 60 is impressed into the material 24 of the work piece 16'. This transverse groove extends preferably from side to side of the work piece. Importantly, the relatively dull impressing portion 58' of member 58 impresses the groove 60 across the work piece from side to side substantially without cutting through the work piece and substantially without cutting internal fibers of this work piece. That is, the fibers of the inorganic fibrous mat from which the sheet shingle material 24 of work piece 16' is made (i.e., along with flexibility improved asphalt and granular materials) are not significantly cut or broken by this impressing operation. The members 56 and 58 are shown respectively on the underside and on the top side of the work piece 16', but this relative position may be reversed in order to impress a groove across the underside of the work piece 16'.

Figure 9 provides a top plan view of the work piece 16' subsequent to forming of four side to side impressed transverse grooves (indicated with the arrowed numerals 60a, 60b, 60c, and 60d). The grooves 60a-60d extend substantially perpendicularly to a length dimension of the work piece 16' That is, the grooves 60a-60d extend substantially parallel to the end edges 48 and 50'. These grooves 60 are located at the sites of the desired folds in order to back fold the work piece 16' in itself and to thus form the thickened portion 22 of the finished ridge cover 16, recalling the description above. Further, each alternate groove is formed on the underside of the work piece 16'. That is, grooves 60a and 60c are formed on the top face of the work piece 16', while grooves 60b, and 60d are formed on the lower face of the work piece 16'.

Turning now to Figure 10, a diagrammatic side elevation view of the work piece 16' during the formation of a first two of the back folds which will form the thickened section 22 is illustrated. For purposes of this explanation, the grooves 60a – 60d have been indicated with arrowed numerals 1-4. As is seen in Figure 10, a first fold of substantially 90° is formed at the location of groove 1, and a second fold of substantially 90° in the opposite direction is formed at the location of groove 4. These folds may be formed in the opposite order or may be formed simultaneously. Importantly, the folds at locations of grooves 1 and 4 results in the work piece 16' now having substantially a Z-shape (albeit a Z-shape on its side as seen in Figure 10).

Next, as is seen in Figure 11, oppositely directed forces are applied intermediate of the folds 1 and 4, generally parallel to the planes of the portions 18 and 20, and at the locations of the folds 2 and 4, to again cause folds to begin forming at the locations of transverse grooves impressed earlier in the manufacturing operation. In this case, oppositely disposed grooves are forming at the locations of grooves 2 and 3.

Subsequently, as is seen in Figure 12, vertically directed forces are applied to collapse the back folded portion 22 on itself. That is, the mere beginnings of the formation of the folds at locations 2 and 3 (especially with folds 1 and 4 being 90° folds), followed by the application of the vertically directed forces indicated by the arrows on Figure 12, is sufficient to cause the back folded portion 22 to form and collapse on itself.

Figure 13 depicts the additional application of finishing vertically directed forces to press the back folded portion 22 into a compact back folded (i.e., accordion folded) structure.

Figure 14 is an end elevation view of the backfolded work piece 16' subsequent to the step shown in Figure 13, and during a lengthwise folding step to result in the ridge cover seen in Figure 3. During this lengthwise folding step, each side of the work piece is subjected to a downwardly directed force, while an upwardly directed force is applied centrally along the length of the workpiece. Consequently, the T-shaped slit opens (recalling the description above) and a ridge cover as seen in Figure 3 results, ready to be packed into a box for shipping to a job site where it is installed on a roof as described above.

Figure 14a illustrates diagrammatically that alternatively, a nested group of plural ridge covers 16 (in this case, four nested ridge covers 16, although the invention is not so limited) may be stacked in a staggered group such that the thickened portions 22 abut one another, and the

group is then folded lengthwise in order to form a packing unit of plural nested ridge covers, as is depicted in Figure 14a. This packing unit is then packed into a box or cartion, as was explained with reference to Figure 3, and successive packing groups of plural ridge covers are reversed in direction in the carton so that they nest together in plan view much as was depicted and described by reference to Figure 3.

Figure 15 illustrates an alternative method of manufacturing the ridge covers 16 according to this invention. As is seen in Figure 15, a manufacturing intermediate article 142 is in all respects the same as the manufacturing intermediate article 42 depicted and described above, and includes plural work pieces 116, except that the article 142 has impressed into it eight elongate grooves (indicated with numerals 156a-156d and 256a-256d) extending parallel to the centerline 144, and each groove 156/256 has a location corresponding to one of the grooves 60a-60d described above. In other words, the elongate grooves 156a-156d and 256a-256d cross the individual work pieces 116 at the locations of grooves 60a-60d, but are continuous grooves extending all along the length of the manufacturing intermediate article 142. After the individual work pieces 116 are separated out of the article 142, these individual work pieces may be folded at the locations of grooves 156a-156d (or at 256a-256d) in order to form ridge covers 16 which are finished by the lengthwise folding step indicated in Figure 14.

While the present invention has been depicted, described, and is defined by reference to a particularly preferred embodiment of the invention, such reference does not imply a limitation on the invention, and no such limitation is to be inferred. The invention is capable of considerable modification, alteration, and equivalents in form and function, as will occur to those ordinarily skilled in the pertinent arts. The depicted and described preferred embodiment of the invention is exemplary only, and is not exhaustive of the scope of the invention. Consequently, the invention is intended to be limited only by the spirit and scope of the appended claims, giving full cognizance to equivalents in all respects.